SEQUENCE LISTING

<110> Terumo Corporation

<120> Functional Hybrid Polypeptide with Collagen-binding Activity

<130> 19990120

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<160> 16

<170> PatentIn Ver. 2.0

<210> 1

<211> 343

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Modified Human Fibronectin Collagen-Binding Domain

<220>

<221> INIT __MET

<222> (1)

<220>

<221> DOMAIN

<222> (2)..(341)

<223> /note="human fibronectin collagen-binding domain"

<220>

<221> CONFLICT

<222> (69)

<220>

<221> CONFLICT

<222> (125)

<400> 1

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 1               5                  10                  15
Gly His Cys Val Thr Asp Ser Gly Val Val Tyr Ser Val Gly Met Gln
            20                  25                  30
Trp Leu Lys Thr Gln Gly Asn Lys Gln Met Leu Cys Thr Cys Leu Gly
        35                  40                  45
Asn Gly Val Ser Cys Gln Glu Thr Ala Val Thr Gln Thr Tyr Gly Gly
    50                  55                  60
Asn Ser Asn Gly Glu Pro Cys Val Leu Pro Phe Thr Tyr Asn Gly Arg
65                  70                  75                  80
Thr Phe Tyr Ser Cys Thr Thr Glu Gly Arg Gln Asp Gly His Leu Trp
                85                  90                  95
Cys Ser Thr Thr Ser Asn Tyr Glu Gln Asp Gln Lys Tyr Ser Phe Cys
            100                 105                 110
Thr Asp His Thr Val Leu Val Gln Thr Arg Gly Gly Asn Ser Asn Gly
        115                 120                 125
Ala Leu Cys His Phe Pro Phe Leu Tyr Asn Asn His Asn Tyr Thr Asp
    130                 135                 140
Cys Thr Ser Glu Gly Arg Arg Asp Asn Met Lys Trp Cys Gly Thr Thr
145                 150                 155                 160
Gln Asn Tyr Asp Ala Asp Gln Lys Phe Gly Phe Cys Pro Met Ala Ala
                165                 170                 175
His Glu Glu Ile Cys Thr Thr Asn Glu Gly Val Met Tyr Arg Ile Gly
            180                 185                 190
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Asp Gln Trp Asp Lys Gln His Asp Met Gly His Met Met Arg Cys Thr
195 200 205
Cys Val Gly Asn Gly Arg Gly Glu Trp Thr Cys Ile Ala Tyr Ser Gln
210 215 220
Leu Arg Asp Gln Cys Ile Val Asp Asp Ile Thr Tyr Asn Val Asn Asp
225 230 235 240
Thr Phe His Lys Arg His Glu Glu Gly His Met Leu Asn Cys Thr Cys
245 250 255
Phe Gly Gln Gly Arg Gly Arg Trp Lys Cys Asp Pro Val Asp Gln Cys
260 265 270
Gln Asp Ser Glu Thr Gly Thr Phe Tyr Gln Ile Gly Asp Ser Trp Glu
275 280 285
Lys Tyr Val His Gly Val Arg Tyr Gln Cys Tyr Cys Tyr Gly Arg Gly
290 295 300
Ile Gly Glu Trp His Cys Gln Pro Leu Gln Thr Tyr Pro Ser Ser Ser
305 310 315 320
Gly Pro Val Glu Val Phe Ile Thr Glu Thr Pro Ser Gln Pro Asn Ser
325 330 335
His Pro Ile Gln Trp Leu Glu
340

<210> 2

<211> 159

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Human Basic Fibroblast Growth Factor with Enterokinase

Recognition Sequence

<220>

<221> PEPTIDE

<222> (1)..(5)

<223> /note="enterokinase recognition sequence"

<220>

<221> PEPTIDE

<222> (6)..(159)

<223> /note="human fibroblast growth factor"

<400> 2

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Asp Asp Asp Asp Lys Ala Ala Gly Ser Ile Thr Thr Leu Pro Ala Leu
  1               5                  10                  15
Pro Glu Asp Gly Gly Ser Gly Ala Phe Pro Pro Gly His Phe Lys Asp
             20                  25                  30
Pro Lys Arg Leu Tyr Cys Lys Asn Gly Gly Phe Phe Leu Arg Ile His
         35                  40                  45
Pro Asp Gly Arg Val Asp Gly Val Arg Glu Lys Ser Asp Pro His Ile
     50                  55                  60
Lys Leu Gln Leu Gln Ala Glu Glu Arg Gly Val Val Ser Ile Lys Gly
 65                  70                  75                  80
Val Cys Ala Asn Arg Tyr Leu Ala Met Lys Glu Asp Gly Arg Leu Leu
                 85                  90                  95
Ala Ser Lys Cys Val Thr Asp Glu Cys Phe Phe Phe Glu Arg Leu Glu
            100                 105                 110
Ser Asn Asn Tyr Asn Thr Tyr Arg Ser Arg Lys Tyr Thr Ser Trp Tyr
        115                 120                 125
Val Ala Leu Lys Arg Thr Gly Gln Tyr Lys Leu Gly Ser Lys Thr Gly
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130 135 140

Pro Gly Gln Lys Ala Ile Leu Phe Leu Pro Met Ser Ala Lys Ser

145 150 155

<210> 3

<211> 58

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Human Epidermal Growth Factor with Enterokinase Recognition Sequence

<220>

<221> PEPTIDE

<222> (1)..(5)

<223> /note="enterokinase recognition sequence"

<220>

<221> PEPTIDE

<222> (6)..(58)

<223> /note="human epidermal growth factor"

<400> 3

Asp Asp Asp Asp Lys Asn Ser Asp Ser Glu Cys Pro Leu Ser His Asp

1 5 10 15

Gly Tyr Cys Leu His Asp Gly Val Cys Met Tyr Ile Glu Ala Leu Asp

20 25 30

Lys Tyr Ala Cys Asn Cys Val Val Gly Tyr Ile Gly Glu Arg Cys Gln

35 40 45

Tyr Arg Asp Leu Lys Trp Trp Glu Leu Arg

50 55

<210> 4

<211> 501

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Hybrid Polypeptide of Human Fibronectin Collagen-Binding Domain and Human Basic Fibroblast Growth Factor

<220>

<221> INIT __MET

<222> (1)

<220>

<221> DOMAIN

<222> (2)..(341)

<223> /note="human fibronectin collagen-binding domain"

<220>

<221> PEPTIDE

<222> (343)..(347)

<223> /note="enterokinase recognition sequence"

<220>

<221> PEPTIDE

<222> (348)..(501)

<223> /note="human fibroblast growth factor"

<400> 4

Met Ala Ala Val Tyr Gln Pro Gln Pro His Pro Gln Pro Pro Pro Tyr

1 5 10 15

Gly His Cys Val Thr Asp Ser Gly Val Val Tyr Ser Val Gly Met Gln
20 25 30
Trp Leu Lys Thr Gln Gly Asn Lys Gln Met Leu Cys Thr Cys Leu Gly
35 40 45
Asn Gly Val Ser Cys Gln Glu Thr Ala Val Thr Gln Thr Tyr Gly Gly
50 55 60
Asn Ser Asn Gly Glu Pro Cys Val Leu Pro Phe Thr Tyr Asn Gly Arg
65 70 75 80
Thr Phe Tyr Ser Cys Thr Thr Glu Gly Arg Gln Asp Gly His Leu Trp
85 90 95
Cys Ser Thr Thr Ser Asn Tyr Glu Gln Asp Gln Lys Tyr Ser Phe Cys
100 105 110
Thr Asp His Thr Val Leu Val Gln Thr Arg Gly Gly Asn Ser Asn Gly
115 120 125
Ala Leu Cys His Phe Pro Phe Leu Tyr Asn Asn His Asn Tyr Thr Asp
130 135 140
Cys Thr Ser Glu Gly Arg Arg Asp Asn Met Lys Trp Cys Gly Thr Thr
145 150 155 160
Gln Asn Tyr Asp Ala Asp Gln Lys Phe Gly Phe Cys Pro Met Ala Ala
165 170 175
His Glu Glu Ile Cys Thr Thr Asn Glu Gly Val Met Tyr Arg Ile Gly
180 185 190
Asp Gln Trp Asp Lys Gln His Asp Met Gly His Met Met Arg Cys Thr
195 200 205
Cys Val Gly Asn Gly Arg Gly Glu Trp Thr Cys Ile Ala Tyr Ser Gln
210 215 220
Leu Arg Asp Gln Cys Ile Val Asp Asp Ile Thr Tyr Asn Val Asn Asp

```
225                 230                 235                 240
Thr Phe His Lys Arg His Glu Glu Gly His Met Leu Asn Cys Thr Cys
                245                 250                 255
Phe Gly Gln Gly Arg Gly Arg Trp Lys Cys Asp Pro Val Asp Gln Cys
            260                 265                 270
Gln Asp Ser Glu Thr Gly Thr Phe Tyr Gln Ile Gly Asp Ser Trp Glu
        275                 280                 285
Lys Tyr Val His Gly Val Arg Tyr Gln Cys Tyr Cys Tyr Gly Arg Gly
    290                 295                 300
Ile Gly Glu Trp His Cys Gln Pro Leu Gln Thr Tyr Pro Ser Ser Ser
305                 310                 315                 320
Gly Pro Val Glu Val Phe Ile Thr Glu Thr Pro Ser Gln Pro Asn Ser
                325                 330                 335
His Pro Ile Gln Trp Leu Asp Asp Asp Asp Lys Ala Ala Gly Ser Ile
            340                 345                 350
Thr Thr Leu Pro Ala Leu Pro Glu Asp Gly Gly Ser Gly Ala Phe Pro
        355                 360                 365
Pro Gly His Phe Lys Asp Pro Lys Arg Leu Tyr Cys Lys Asn Gly Gly
    370                 375                 380
Phe Phe Leu Arg Ile His Pro Asp Gly Arg Val Asp Gly Val Arg Glu
385                 390                 395                 400
Lys Ser Asp Pro His Ile Lys Leu Gln Leu Gln Ala Glu Glu Arg Gly
                405                 410                 415
Val Val Ser Ile Lys Gly Val Cys Ala Asn Arg Tyr Leu Ala Met Lys
            420                 425                 430
Glu Asp Gly Arg Leu Leu Ala Ser Lys Cys Val Thr Asp Glu Cys Phe
        435                 440                 445
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Phe Phe Glu Arg Leu Glu Ser Asn Asn Tyr Asn Thr Tyr Arg Ser Arg
450 455 460

Lys Tyr Thr Ser Trp Tyr Val Ala Leu Lys Arg Thr Gly Gln Tyr Lys
465 470 475 480

Leu Gly Ser Lys Thr Gly Pro Gly Gln Lys Ala Ile Leu Phe Leu Pro
485 490 495

Met Ser Ala Lys Ser
500

<210> 5

<211> 400

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Hybrid Polypeptide of Human Fibronectin Collagen-Binding Domain and Human Epidermal Growth Factor

<220>

<221> INIT __MET

<222> (1)

<220>

<221> DOMAIN

<222> (2)..(341)

<223> /note="human fibronectin collagen-binding domain"

<220>

<221> PEPTIDE

<222> (343)..(347)

<223> /note=" enterokinase recognition sequence"

<220>

<221> PEPTIDE

<222> (348)..(400)

<223> /note="human epidermal growth factor"

<400> 5

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Met Ala Ala Val Tyr Gln Pro Gln Pro His Pro Gln Pro Pro Pro Tyr
  1               5                  10                  15
Gly His Cys Val Thr Asp Ser Gly Val Val Tyr Ser Val Gly Met Gln
             20                  25                  30
Trp Leu Lys Thr Gln Gly Asn Lys Gln Met Leu Cys Thr Cys Leu Gly
         35                  40                  45
Asn Gly Val Ser Cys Gln Glu Thr Ala Val Thr Gln Thr Tyr Gly Gly
     50                  55                  60
Asn Ser Asn Gly Glu Pro Cys Val Leu Pro Phe Thr Tyr Asn Gly Arg
 65                  70                  75                  80
Thr Phe Tyr Ser Cys Thr Thr Glu Gly Arg Gln Asp Gly His Leu Trp
                 85                  90                  95
Cys Ser Thr Thr Ser Asn Tyr Glu Gln Asp Gln Lys Tyr Ser Phe Cys
            100                 105                 110
Thr Asp His Thr Val Leu Val Gln Thr Arg Gly Gly Asn Ser Asn Gly
        115                 120                 125
Ala Leu Cys His Phe Pro Phe Leu Tyr Asn Asn His Asn Tyr Thr Asp
    130                 135                 140
Cys Thr Ser Glu Gly Arg Arg Asp Asn Met Lys Trp Cys Gly Thr Thr
145                 150                 155                 160
Gln Asn Tyr Asp Ala Asp Gln Lys Phe Gly Phe Cys Pro Met Ala Ala
                165                 170                 175
```

His Glu Glu Ile Cys Thr Thr Asn Glu Gly Val Met Tyr Arg Ile Gly
180 185 190
Asp Gln Trp Asp Lys Gln His Asp Met Gly His Met Met Arg Cys Thr
195 200 205
Cys Val Gly Asn Gly Arg Gly Glu Trp Thr Cys Ile Ala Tyr Ser Gln
210 215 220
Leu Arg Asp Gln Cys Ile Val Asp Asp Ile Thr Tyr Asn Val Asn Asp
225 230 235 240
Thr Phe His Lys Arg His Glu Glu Gly His Met Leu Asn Cys Thr Cys
245 250 255
Phe Gly Gln Gly Arg Gly Arg Trp Lys Cys Asp Pro Val Asp Gln Cys
260 265 270
Gln Asp Ser Glu Thr Gly Thr Phe Tyr Gln Ile Gly Asp Ser Trp Glu
275 280 285
Lys Tyr Val His Gly Val Arg Tyr Gln Cys Tyr Cys Tyr Gly Arg Gly
290 295 300
Ile Gly Glu Trp His Cys Gln Pro Leu Gln Thr Tyr Pro Ser Ser Ser
305 310 315 320
Gly Pro Val Glu Val Phe Ile Thr Glu Thr Pro Ser Gln Pro Asn Ser
325 330 335
His Pro Ile Gln Trp Leu Asp Asp Asp Asp Lys Asn Ser Asp Ser Glu
340 345 350
Cys Pro Leu Ser His Asp Gly Tyr Cys Leu His Asp Gly Val Cys Met
355 360 365
Tyr Ile Glu Ala Leu Asp Lys Tyr Ala Cys Asn Cys Val Val Gly Tyr
370 375 380
Ile Gly Glu Arg Cys Gln Tyr Arg Asp Leu Lys Trp Trp Glu Leu Arg

385 390 395 400

<210> 6

<211> 49

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR Sense Primer for Human Fibronectin Collagen-Binding Domain

<400> 6

gaggtaccat ggtacatatg gcagctgttt accaaccgca gcctcaccc 49

<210> 7

<211> 46

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR Antisense Primer for Human Fibronectin Collagen-Binding Domain

<220>

<400> 7

cgggatcctt actcgagcca ctggatgggg tgggagttgg gctgac 46

<210> 8

<211> 1053

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Modified Human Fibronectin Collagen-Binding Domain

<220>

<221> conflict

<222> (109)

<220>

<221> conflict

<222> (206)

<220>

<221> conflict

<222> (270)

<220>

<221> conflict

<222> (374)

<220>

<221> conflict

<222> (681)

<400> 8

ggtaccatgg tacatatggc agctgtttac caaccgcagc ctcaccccca gcctcctccc 60

tatggccact gtgtcacaga cagtggtgtg gtctactctg tggggatgca gtggctgaag 120

acacaaggaa ataagcaaat gctttgcacg tgcctgggca acggagtcag ctgccaagag 180

acagctgtaa cccagactta cggtggcaac tcaaatggag agccatgtgt cttaccattc 240

acctacaatg gcaggacgtt ctactcctgc accacagaag ggcgacagga cggacatctt 300

tggtgcagca caacttcgaa ttatgagcag gaccagaaat actctttctg cacagaccac 360

actgttttgg ttcagactcg aggaggaaat tccaatggtg ccttgtgcca cttccccttc 420

ctatacaaca accacaatta cactgattgc acttctgagg gcagaagaga caacatgaag 480

tggtgtggga ccacacagaa ctatgatgcc gaccagaagt ttgggttctg ccccatggct 540

gcccacgagg aaatctgcac aaccaatgaa ggggtcatgt accgcattgg agatcagtgg 600

gataagcagc atgacatggg tcacatgatg aggtgcacgt gtgttgggaa tggtcgtggg 660

gaatggacat gcattgccta ctcgcagctt cgagatcagt gcattgttga tgacatcact 720

tacaatgtga acgacacatt ccacaagcgt catgaagagg ggcacatgct gaactgtaca 780

tgcttcggtc agggtcgggg caggtggaag tgtgatcccg tcgaccaatg ccaggattca 840

gagactggga cgttttatca aattggagat tcatgggaga agtatgtgca tggtgtcaga 900

taccagtgct actgctatgg ccgtggcatt ggggagtggc attgccaacc tttacagacc 960

tatccaagct caagtggtcc tgtcgaagta tttatcactg agactccgag tcagcccaac 1020

tcccacccca tccagtggct cgagtaagga tcc 1053

<210> 9

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR Sense
Primer for Human Basic Fibroblast Growth Factor

<400> 9

gagtcgacga cgatgataag gcagccggga gcatcaccac 40

<210> 10

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR Antisense
Primer for Human Basic Fibroblast Growth Factor

<400> 10

ggaattctca gctcttagca gacattggaa g 31

<210> 11

<211> 489

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Human Basic Fibroblast Growth Factor with Enterokinase Recognition Sequence

<220>

<221> mutation

<222> (228)

<223> /note="mutation caused by polymerase chain reaction"

<400> 11

gtcgacgacg atgataaggc agccgggagc atcaccacgc tgcccgcctt gcccgaggat 60

ggcggcagcg gcgccttccc gcccggccac ttcaaggacc ccaagcggct gtactgcaaa 120

aacgggggct tcttcctgcg catccacccc gacggccgag ttgacggggt ccgggagaag 180

agcgaccctc acatcaagct acaacttcaa gcagaagaga gaggagtcgt gtctatcaaa 240

ggagtgtgtg ctaaccgtta cctggctatg aaggaagatg gaagattact ggcttctaaa 300

tgtgttacgg atgagtgttt ctttttttgaa cgattggaat ctaataacta caatacttac 360

cggtcaagga aatacaccag ttggtatgtg gcactgaaac gaactgggca gtataaactt 420

ggatccaaaa caggacctgg gcagaaagct atacttttttc ttccaatgtc tgctaagagc 480

tgagaattc 489

<210> 12

<211> 44

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR Sense Primer for Human Epidermal Growth Factor

<400> 12

gtgtcgacga cgatgataag aatagtgact ctgaatgtcc cctg 44

<210> 13

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:PCR Antisense Primer for Human Epidermal Growth Factor

<400> 13

gaattcttag cgcagttccc accacttcag 30

<210> 14

<211> 186

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Human Epidermal Growth Factor with Enterokinase Recognition Sequence

<400> 14

gtcgacgacg atgataagaa tagtgactct gaatgtcccc tgtcccacga tgggtactgc 60

ctccatgatg gtgtgtgcat gtatattgaa gcattggaca agtatgcatg caactgtgtt 120

gttggctaca tcggggagcg atgtcagtac cgagacctga agtggtggga actgcgctaa 180

gaattc 186

<210> 15

<211> 1527

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Hybrid Polypeptide of Human Fibronectin Collagen-Binding Domain and Human Fibroblast Growth Factor

<400> 15

ggtaccatgg tacatatggc agctgtttac caaccgcagc ctcaccccca gcctcctccc 60

tatggccact gtgtcacaga cagtggtgtg gtctactctg tggggatgca gtggctgaag 120

acacaaggaa ataagcaaat gctttgcacg tgcctgggca acggagtcag ctgccaagag 180

acagctgtaa cccagactta cggtggcaac tcaaatggag agccatgtgt cttaccattc 240

acctacaatg gcaggacgtt ctactcctgc accacagaag ggcgacagga cggacatctt 300

tggtgcagca caacttcgaa ttatgagcag gaccagaaat actctttctg cacagaccac 360

actgttttgg ttcagactcg aggaggaaat tccaatggtg ccttgtgcca cttccccttc 420

ctatacaaca accacaatta cactgattgc acttctgagg gcagaagaga caacatgaag 480

tggtgtggga ccacacagaa ctatgatgcc gaccagaagt ttgggttctg ccccatggct 540

gcccacgagg aaatctgcac aaccaatgaa ggggtcatgt accgcattgg agatcagtgg 600

gataagcagc atgacatggg tcacatgatg aggtgcacgt gtgttgggaa tggtcgtggg 660

gaatggacat gcattgccta ctcgcagctt cgagatcagt gcattgttga tgacatcact 720

tacaatgtga acgacacatt ccacaagcgt catgaagagg ggcacatgct gaactgtaca 780

tgcttcggtc agggtcgggg caggtggaag tgtgatcccg tcgaccaatg ccaggattca 840

gagactggga cgttttatca aattggagat tcatgggaga agtatgtgca tggtgtcaga 900

taccagtgct actgctatgg ccgtggcatt ggggagtggc attgccaacc tttacagacc 960

tatccaagct caagtggtcc tgtcgaagta tttatcactg agactccgag tcagcccaac 1020

tcccacccca tccagtggct cgacgacgat gataaggcag ccgggagcat caccacgctg 1080

cccgccttgc ccgaggatgg cggcagcggc gccttcccgc ccggccactt caaggacccc 1140

aagcggctgt actgcaaaaa cgggggcttc ttcctgcgca tccaccccga cggccgagtt 1200

gacggggtcc gggagaagag cgaccctcac atcaagctac aacttcaagc agaagagaga 1260

ggagtcgtgt ctatcaaagg agtgtgtgct aaccgttacc tggctatgaa ggaagatgga 1320

agattactgg cttctaaatg tgttacggat gagtgtttct tttttgaacg attggaatct 1380

aataactaca atacttaccg gtcaaggaaa tacaccagtt ggtatgtggc actgaaacga 1440

actgggcagt ataaacttgg atccaaaaca ggacctgggc agaaagctat acttttttctt 1500

ccaatgtctg ctaagagctg agaattc 1527

<210> 16

<211> 1224

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Hybrid
Polypeptide of Human Fibronectin Collagen-Binding
Domain and Human Epidermal growth factor

<400> 16

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tatggccact gtgtcacaga cagtggtgtg gtctactctg tggggatgca gtggctgaag 120

acacaaggaa ataagcaaat gctttgcacg tgcctgggca acggagtcag ctgccaagag 180

acagctgtaa cccagactta cggtggcaac tcaaatggag agccatgtgt cttaccattc 240

acctacaatg gcaggacgtt ctactcctgc accacagaag ggcgacagga cggacatctt 300

tggtgcagca caacttcgaa ttatgagcag gaccagaaat actctttctg cacagaccac 360

actgttttgg ttcagactcg aggaggaaat tccaatggtg ccttgtgcca cttccccttc 420

ctatacaaca accacaatta cactgattgc acttctgagg gcagaagaga caacatgaag 480

tggtgtggga ccacacagaa ctatgatgcc gaccagaagt ttgggttctg ccccatggct 540

gcccacgagg aaatctgcac aaccaatgaa ggggtcatgt accgcattgg agatcagtgg 600

gataagcagc atgacatggg tcacatgatg aggtgcacgt gtgttgggaa tggtcgtggg 660

gaatggacat gcattgccta ctcgcagctt cgagatcagt gcattgttga tgacatcact 720

tacaatgtga acgacacatt ccacaagcgt catgaagagg ggcacatgct gaactgtaca 780

tgcttcggtc agggtcgggg caggtggaag tgtgatcccg tcgaccaatg ccaggattca 840

gagactggga cgttttatca aattggagat tcatgggaga agtatgtgca tggtgtcaga 900

taccagtgct actgctatgg ccgtggcatt ggggagtggc attgccaacc tttacagacc 960

tatccaagct caagtggtcc tgtcgaagta tttatcactg agactccgag tcagcccaac 1020

tcccacccca tccagtggct cgacgacgat gataagaata gtgactctga atgtcccctg 1080

tcccacgatg ggtactgcct ccatgatggt gtgtgcatgt atattgaagc attggacaag 1140

tatgcatgca actgtgttgt tggctacatc ggggagcgat gtcagtaccg agacctgaag 1200

tggtgggaac tgcgctaaga attc 1224